



Housewife sustained livelihood through Climate Resilient Technologies

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ABSTRACT

Climate change is one of the most pressing issues of this time. Temperatures are rising, drought and wild fire accidents are more frequent, rainfall patterns are shifting, glaciers and snow are melting, global mean sea level is rising. Agriculture, which is the backbone of the Indian economy, is directly being affected by these adverse changes in climate. Namsai, an aspirational district which has been identified as one among the most vulnerable to climate change. The district where farmers are already facing incidences of flash flood, mild drought, insect pest infestation, etc. Livestock are also experiencing heat stress, stress due to animal feed shortfalls and spread of parasites and vector-borne diseases. In order to mitigate the such adverse effects of climate change, the Krishi Vigyan Kendra (KVK), Namsai undertook demonstration programmes of various climate resilient technologies through National Innovation in Climate Resilient Agriculture (NICRA) project under Technology Demonstration Component (TDC). Smt. Nang Samathi Longkan of Mengkeng Khamti village adopted under the NICRA project has shown impressive results by following diligently all the risk management technologies and advice given based on the vulnerability of the region. Agriculture being the primary source of income of the family, prior to the interventions in the village Smt Samathi's family income was around 1 lakh only. In 2022-23, post intervention, her hard and smart work paid off by doubling their family income, improving their financial state. She has inspired and motivated many of the other co-farmers in and around her village.

Situation Analysis

Namsai, the 18th district of Arunachal Pradesh, established on 25th November, 2014 with 1587 Sq. km of geographical area. It is situated in the north-eastern most part of India, lying in the foothills of the Eastern Himalayan zone with 95.45° to 96.20°E longitudes, 27.30° to 27.55°N latitude and an altitude less than 200 mtrs above the mean sea level. The only plane district of Arunachal Pradesh, located beside the river basin of Dihing, which is a tributary of the Brahmaputra River. The maximum and minimum temperature of this district is 10°C - 25°C in winter and 28°C - 38°C in summer. The vegetation has the general characteristics of the tropical wet semi-evergreen forest of the Himalayan mountain ecosystem. The district, has abundant scope for agriculture and allied sectors and is predominantly an agrarian district. It has a warm and sub-tropical climate with an average annual temperature of 22.8°C and

average rainfall is about 2728 mm. Most of the farmers are small and marginal, cultivate traditional landraces of lowland rice. Medium and long duration rice varieties like Ranjit, Khamti Lahi, Sali and Bora rice are popularly grown as rainfed crop in the region with average productivity of 2.5 t/ha. The rainy season starts with one or two spells of rain in the month of March, followed by heavy rain during June – August. The rainy season ends in October. The district is prone to flash floods. Every year, some parts of the district experience 2-3 spells of flash floods inundating the village with 2-3 feet of deep water for a duration of 5-7 days in each spell. The months of December – February are the driest season. There is a lack of irrigation facilities during winter months in the district. Despite having fertile alluvial soils, the cropping intensity of the district is low as farmers keep their land fallow during the winter months. Some areas of the district experience drought like situations during

winter months. There is vast scope for varietal substitution in rice with varieties which are suitable for the lowland rice ecosystem and combat challenges of climate change. The farmers are unaware of such lowland varieties. The KVK, Namsai undertook demonstrations on the introduction of lowland rice varieties followed by cultivation of other crops as rice fallow during winter months through the NICRA project since 2022.

Plan, Implementation and Support

Mengkeng Khamti, a small village with 50 households situated in Piyong circle of Namsai district, has a total population of 230, out of which the male population is 114 while the female population is 116. Literacy rate of mengkeng khamti village is 37.39%. The riverine dwellers mostly Khampti and Adi tribe and are dependent on agriculture and livestock for livelihood. The village is prone to climatic adversities like flash floods, intermittent drought like situations. On the basis of climatic vulnerability, the village was adopted under NICRA for demonstrating climate resilient technologies to sustain livelihood in the year 2022.

Smt. Nang Samathi Longkan, a 46 year old hardworking lady, seemed intrigued with the new technologies showcased by KVK Namsai. She has a family of 5 members, including her husband and 3 children. The family is solely dependent on agricultural farming for their source of income. Holding 6 ha of land, she cultivates paddy in 3 ha, 2 ha area is covered by seasonal crops and 1 ha area is marshy land. After every harvest from the farm, she would sell the products directly to a market, which is at a distance of 9 km from the farm. However, lately the changing weather conditions have led to increase in incidences of flash flood every monsoon in the paddy field resulting in poor crop performance and dry spell during the rabi season affecting the production of toria and other seasonal crops. Along with the cultivation of agricultural crops, she is also keen on livestock farming and has been rearing some local pigs in a traditional method since the last few years. Despite all her dedication and hard work, the family still faced financial instability. She was not satisfied with the traditional way of farming because she

was determined to do farming with improved agricultural technologies. Selecting her as a beneficiary under the NICRA-TDC project was like a boon to her family and aided the family to increase its family income.

Initially, she along with other beneficiaries of the village were informed about the vulnerability of climatic change by KVK Namsai. Then demonstrations were undertaken on different climate resilient technologies based on their local vulnerability issues. She was facilitated with a submergence tolerant rice variety Swarna Sub-I which can withstand flash flood situations. The flash flood situation occurred in Mengkeng Khamti village for at least 6-7 days from 17th July-23rd July, 2022. The rice seedling in nursery bed submerged upto 60-65 cm depth of water. The rice var. Swarna sub-I survived but the local variety Khamti Lahi was completely destroyed. The farmers broadcast urea when rice seedling receded under water for emergence of newly leaves and tillers after 6 - 7 days. The toria variety TS-67 that is suitable in paddy-toria cropping sequence under late sown condition and thrives well in drought situation was also introduced. She cultivated Swarna Sub-I in 1.0 ha of land during the Kharif season. In the Rabi season, cultivated Toria TS-67 on 1 ha of land after harvesting of paddy. She was advised to add borax during the land preparation of toria since the soil of Namsai district is deficient in boron. She has been rearing local pigs, which were found to be unproductive in terms of body weight gain and piglet production. Moreover, she was not following any scientific housing for pigs and reared pigs only feeding with locally available material. A number of training was provided on various aspects of the scientific way of rearing pigs so that she could draw maximum profit out of pig farm. Two numbers of 3 months old cross-bred piglets and 50 kg of starter pig feed were provided to her initially. She sincerely followed all the instructions and advice given by KVK scientist on scientific rearing practices including scheduled deworming and vaccination for swine fever. She also renovated her pig shelter from kuccha to pucca floor with the technical guidance from KVK. The trainings she attended helped her built confidence in managing improved pigs for breeding and motivated her to invest more time

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Flash flood situation in mengkang khamti village for 6-7 days(17th July- 23rd July)

and energy in managing her pigs. Time to time, diagnostic visits were carried out by KVK Namsai scientists and provided various assistance on plant health, veterinary services, training, etc.

Output

Year 2022-23, the year of KVK Namsai intervention in the village of Mengkeng Khamti, Smt. Nang Samathi Longkan, with her own capability, enthusiasm and our institutional assistance she could witness with impressive growth and bounty yield from the crops and a good net return from the livestock sector throughout the year. She is in constant touch with the KVK and adopted innovative and sustainable farm practices resulting in enhanced returns and developed a model of a sustainable integrated farming system which is worth replicating in the region. During Rabi season, she grows oilseeds like toria while in



Survival of rice seedlings var. Swarna sub-I after flash flood

Kharif season she grows paddy. She has become one of the progressive farmers in piggery farming within a short period of time. Her pigs attained sexual maturity at the age of 8 months and gained an average body weight of 80 kg at 12 months of age, which was reported far much better than the average body weight (45kg) of local pigs. The sow had a good little size of 12 and is now 1 month pregnant.

The net income of her enterprise is about Rs. 2 lakhs a year. The farm produce is mainly sold in the local market as there is high demand for locally produced crops. Simultaneously, she runs a small piggery unit of 2 pigs of improved breed which is highly profitable as there is high demand for pig meat in the area and also the rate of cross bred piglets ranges between Rs. 5000-5500/-

Table 1. Economics of intervention (for crops)

Economics of the farmer before the intervention.					Economics of NICRA farmer after the intervention				
Yield (q/ha)	Cost of production (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B.C ratio	Yield (q/ha)	Cost of production (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	B.C ratio
Paddy - 37.5	40603.5	116250	75646.5	2.8	55.6	52959.95	165000	112040.1	3.1
Toria-5	11760	20,000	8240	2.4	9.6	38400	49455	15755	3.1
% increase in yield after the intervention									
Paddy : 67.4% , Toria : 52.08%									
% increase in net return after the intervention									
Paddy : 67.5% , Toria : 52.3 %									

Table 2: Economics of intervention for piggery

Economics of the farmers before the intervention.					Economics of farmers after the intervention				
Yield (q/unit/year)	Cost of production (Rs/unit/year)	Gross return (Rs/unit/year)	Net return (Rs/unit/year)	B.C ratio	Yield (q/ha)	Cost of production (Rs/unit/year)	Gross return (Rs/unit/year)	Net return (Rs/unit/year)	B.C ratio
5 piglets/year	8430	20000	11570	1.72	12 piglets/year	20420	66000	45580	3.2
% increase in yield after the intervention-41%									
% increase in net return after the intervention-25.4%									



Distribution of rice seed to the farmers of mengkang khamti village



Demonstration of submergence tolerant rice var., Swarna sub-I at Nang Samathi Longkan



Data collection for statistical analysis



Demonstration of toria var. TS- 67 at Nang Samathi Longkan

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Demonstration of an improved breed of pig

Outcome and Impact

Smt. Nang Samathi Longkan has become a source of inspiration for the farming community in the region. She has demonstrated the low cost piggery shelter and efficient and effective use of feed formulation as well. She has been instrumental in the transfer of farm technology in the region. She is always keen to assist and guide fellow farmers for adoption of new technologies. Now the farmers have a positive attitude towards

climate-resilient technologies of the NICRA project. She and the other farmers learnt about the current threats due to climate change and their ground-level solution. The new technologies also acted as an eye opener for the farmers. The project could successfully achieve its goal upto a good extent, however the villagers need more of such awareness and interventions to cope up the changes and uplift their livelihood on household level.